

CLAIMS

We claim:

1. System for the measurement of the index of refraction and the thickness of transparent materials, made up of a "shear interferometer" type, characterized by the fact to be, in turn, made up of: a laser source (1), a supply (2), a collimator (4), a precision rotating stage (7), a photodiode (9), an oscilloscope (10), a control bus IEEE-488 (12), and a personal computer (11).

2. System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 1, characterized by the fact that the laser source (1) is such as to vary the emission wavelength, for example, through the supply (2), controlled through bus IEEE-488 (12) by a personal computer (11).

3. System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 1, characterized by the fact that the acquisition system can be chosen optionally, i.e. a photodiode (9) interfaced with an oscilloscope (10) controlled, through bus IEEE-488 (12), by a personal computer (11).

4. System for the measurement of the index of refraction and the thickness of transparent materials, characterized by the fact that the sample (5) is formed by homogeneous material of plane and parallel faces.

5. System for the measurement of the index of refraction and the thickness of transparent

materials, according to Claim 4, characterized by the fact that the sample (5) is placed vertically on a support (6) and rests on a precision rotating stage (7), whose position is on the direction of the laser beam (13).

6. System for the measurement of the index of refraction and the thickness of transparent materials, according to Claims 1, 4 and 5, characterized by the fact that the laser radiation (13) which traverses the sample is subject to various reflections and refractions within the sample (5) which, by interfering with" each other, produce the interferometric signal (14).

7. System for the measurement of the index of refraction and the thickness of transparent materials, according to the previous claims, characterized by the fact that to perform the measurement of the index of refraction and the thickness of the analyzed sample (5), it is necessary to determine first the measurement of the optical path and subsequently the index of refraction of the sample (5); from these two values the thickness of the investigated sample (5) is evaluated.

8. System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 7, characterized by the fact that the measurement of the optical path occurs by evaluating the interferometric signal obtained upon varying of the angle of incidence (8) for each fixed wavelength of the laser source (1); from the symmetry of the signal acquired on the personal computer (11) it is possible to determine the normal incidence condition ($\theta=0^\circ$); from the interferometric signal relating to said position it is possible to acquire the optical path inside the sample (5).

9. System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 8, characterized by the fact that, by analyzing the interferometric signal according to the angle of incidence (8) and for a fixed wavelength, and using the value of the previously evaluated optical path, it is possible to acquire the value of the index of refraction of the analyzed sample (5).

10. System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 9, characterized by the fact that, by using the value of the optical path and of the index of refraction it is possible to acquire the thickness of the analyzed sample (5).

11. Procedure to measure the index of refraction and the thickness of transparent materials, according to all the previous Claims, to be performed as follows:

provide a support that serves to house the material whose index of refraction and the thickness are to be measured;

said support is placed on a precision rotating stage and then duly inserted in the measurement system so that the sample to be measured is traversed by a coherent and monochromatic light beam;

the coherent light that traverses the sample is subject to various reflections and refractions at the sample interfaces, producing an interference signal;

from observation of the phase variation of the interference signal, following the variation of the wavelength of the coherent light, the optical path is obtained;

from said optical path and observing the interference signal, obtained for each fixed

wavelength of the coherent light source, the index of refraction of the material is obtained;

from said index of refraction value and from the optical path value the thickness of the sample to be measured is obtained.

12. System, and related procedure, for measurement of the index of refraction and the thickness of transparent materials, characterized by the fact that it can be used also for liquids.